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Common species of the Mycetozoa

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The fruiting bodies of the Mycetozoa, Myxomycetes, or slime molds appear abundantly about the middle of June, and continue throughout the summer and autumn until cold weather sets in. They are spore carriers, and develop from a creeping, feeding, growing slime called the plasmodium, which is generally regarded as an animal. The plasmodium is formed from small animal-like bodies germinated from the spores under favorable conditions of warmth and moisture. Plasmodia that have not gone into fruit with the approach of freezing temperature will change themselves into a hardened substance called sclerotium, in which inactive condition they will survive the winter, reviving in the early spring and, after a certain period, forming the first fruiting bodies. Often, during the winter in mild weather, these revivals will come and fruitings develop. After the first revival in the spring, the complete cycle will be repeated during the warmer months, and, in many species, several times.

The plasmodia feed mainly upon bacteria of decaying vegetable matter. The fruiting bodies may therefore be sought on old logs, leaves, ground debris, rubbish piles, and similar habitats that are in a moist condition giving rise to sufficient bacterial food. They are fragile, and when collected should be pinned into old cigar boxes into which a layer of corrugated cardboard has been pressed. On arrival home the specimens should be thoroughly dried with the addition of a small amount of ordinary naphthaline flakes to avoid the ravages of insects. After that they may be trimmed and glued into small boxes, and will keep indefinitely.

The fruiting bodies exhibit great diversity in shape and color among the different species, and are very beautiful under the microscope. There are three general forms of fructification. The

ordinary one is in numerous, small sporangia, either sessile or with stalks, quite uniform in shape and size, and averaging a millimeter or so, although in some species they are larger and may reach a height of 20 mm. Another form is in plasmodiocarps. These are sessile sporangia of irregular shape, sometimes thinly and rather widely effused, or stouter and much elongated, curved, sinuose or in rings. Again they may be branched or netted, the last sometimes covering 20 sq. cm. or more. The third form is in aethalia, which are compound bodies formed by the union of many sporangia and with the walls of the component sporangia more or less imperfectly developed. Aethalia are usually sessile, and of large size, from about 1 cm. to 30 cm.

The Mycetozoa are classified on the characters of the fruiting bodies. More than 50 genera with about 400 species are generally recognized. Obviously, all of them cannot be mentioned in the limited space of this paper—nor can they be fully described—so that only a certain number of the common forms have been selected. The student is likely to find others that cannot be reconciled with the meagre descriptions, and if a small portion, properly boxed and with data, is sent to me, I will be glad to determine it and give any advice desired. The specimen will not be returned.

The higher classification into families, orders, and so on is based on broad, general characters which are herein applied to the genera described, and are present in all species of the genera, whether mentioned or not, unless otherwise stated.

Form of fructification. *Fuligo*, *Tubifera*, *Enteridium*, and *Lycogala* form rather large aethalia with one or two exceptions not mentioned. In all other genera described, except *Ceratiomyxa*, the fructification is always sporangiate or plasmodiocarpous.

Spore color. In all genera Nos. 1–12, *Badhamia* to *Lamproderma* inclusive, the spores have some shade of violet-brown or purplish-gray when observed through the microscope by transmitted light with a magnification of about 600 diam. In all other genera described, the spores have no purple tints, but are yellow, reddish, olivaceous, or colorless. There are some exceptions in each group which are mentioned when the species are covered in this paper. Spore color, size and markings are important specific distinctions between many species.

Lime (calcium carbonate). This is present in all genera Nos. 1-8, *Badhamia* to *Didymium* inclusive. It may be in the stalk, columella, peridium or capillitium; and in all but *Didymium* it is in the form of minute, rounded granules. In *Didymium* it is in crystals, usually in or on the sporangium-wall, and rarely elsewhere. The lime may be recognized by crushing a sporangium in water under a cover glass and observing it with the microscope, when the countless hyaline or colored granules or crystals will be seen among other parts of the sporangium. In lime-less forms they are absent. Also, in some species not mentioned, the lime may be in crystalline plates, rhombs, or irregular masses. There is no lime in the remaining genera except occasionally in certain species of *Trichia* and *Perichaena*, but there it may be ignored as it is usually regarded as anomalous. With a little experience the student will be able to recognize the calcareous genera—in fact any genus—as generic differences, together with general appearance, are prominent enough to be noticed with a hand lens.

Capillitium. This is the system of threads within the sporangium among which the spores are distributed. It is entirely absent in *Cribraria*, *Dictydium*, and *Ceratiomyxa*. In *Tubifera*, *Enteridium* and *Lycogala*, there is no true capillitium but the imperfect walls of the confluent sporangia are regarded as a pseudo-capillitium. In all other genera mentioned there is a true capillitium, the characters of which often make the generic distinctions.

Peridium. This is the wall of the sporangium enclosing the spores and rupturing at maturity. It may consist of several layers, firm or frail; and persistent for some time, or vanishing rapidly after maturity. In aethalioid forms it is usually called the cortex.

Columella. That part of the stalk or an elongation thereof extending into the sporangium; or, in sessile forms, a supporting structure for the capillitium arising within and from the floor of the sporangium.

Genus 1. BADHAMIA

The genus is marked by the character of the capillitium which is calcareous throughout. There is also lime in the peridium. Stalks when present are rarely calcareous, and colu-

mellae are not common among the 17 or 18 known species. Several species are fairly common but require microscopical study to separate them. *B. rubiginosa* is abundant and easily recognized. It has obovoid sporangia on stalks about half the total height, and of a uniform reddish-brown or purple-brown color for sporangia and stalks, the latter continuing as columellae. The top of the sporangium breaks away leaving a persistent lower part, or there may be a distinct lid, which brings the species close to the genus *Craterium* from which it is distinguished by the uniformly calcareous capillitium. It is true, however, that short, hyaline threads are sometimes present in this and other species of *Badhamia*. *B. rubiginosa* is different in superficial appearance from all species of *Craterium*.

Genus 2. PHYSARUM

This is the largest genus of the Mycetozoa, containing perhaps 70 or more species. The capillitium is the important character and consists of a network of hyaline or pale colored threads with expansions filled with lime granules which are called lime-knots. It differs in that respect from *Badhamia* where the threads are entirely calcareous, although there are intermediate forms which, sometimes, are difficult to place. The peridium in *Physarum* has lime granules, and they are frequently present in the stalk and columella. The lime is often colored, and specific distinctions are based on that as well as on sporangial shape, stalk, spores, and other characters. In occasional abnormal instances the lime may be scanty or entirely absent. There are many fairly common species among the more abundant of which may be mentioned *P. globuliferum* which is white throughout in stalk, sporangium and lime-knots. The stalk is calcareous and there is a small, conical columella. The capillitium is persistent, which means that when blown free of spores it remains as a globose mass, and it usually has small, rounded lime-knots. *P. nucleatum* is similar with a persistent capillitium, but with a small, central ball of lime instead of a columella. The stalk is non-calcareous and yellowish in color. *P. nutans* and *P. viride* are much alike except in color of the lime in the peridium and lime-knots, which is white in the first and yellow in *P. viride*. The sporangia in both are somewhat flattened or subglobose, and on stalks that may be partly yellowish and grayish or

darker otherwise. The capillitium is lax, not persistent, and there is no columella. *P. melleum* is globose and yellow, with a lax capillitium, a white or yellow stalk, and a short columella. The stalk is densely calcareous and the lime-knots are large, white or yellow. *P. cinereum* forms sessile sporangia and elongated or branching plasmodiocarps, ashen-white in color. It is distinguished from related species by the globose paler spores which are almost smooth. *P. sinuosum* forms sessile, laterally compressed sporangia and elongated, sinuose or branching plasmodiocarps, similarly compressed. The color is white to grayish or bluish, and the sporangium splits at the top or ridge to disseminate the spores.

Genus 3. FULIGO

The fructification is always in sessile aethalia, the component confluent and interwoven sporangia being similar internally to the individual sporangia of *Physarum*. The common species is *F. septica* which forms large masses, sometimes a foot across, and usually of a yellow color. Occasionally the color runs to dull red or brown, and a white phase in small aethalia is fairly common. The last appears much like *F. cinerea* but may be distinguished by the spores. In *F. septica* these are globose, 6–8 μ diam. In *F. cinerea* they are larger, darker, ellipsoid or subglobose, and more strongly spinulose. Lime in granules is present in *Fuligo*.

Genus 4. CRATERIUM

The capillitium is like that of *Physarum* but the six species are separated therefrom mainly on the goblet-shaped or funnel-shaped, stalked sporangia which have more or less distinct lids. These lids open, and after the spores are dispersed, leave the empty sporangia standing. There are exceptions, of course. The common species is *C. leucocephalum* and its variety *cylindricum*, with sporangia white at the tops, ranging to reddish at the bases and stalks. The variety is more cylindrical in shape. In both the lid is white, convex, and crumbles away; the capillitial lime is usually white, but may be yellow. The next ally is *C. minutum*, which, in the common phase, is uniform in its brown color, and has a lid depressed below the edge of the rim. The lime-knots are white which distinguishes the species from *C. concinnum*,

found only on chestnut burs, and brown like *C. minutum* but with yellow or brown lime-knots.

Genus 5. LEOCARPUS

There is but one species, *L. fragilis*, which is very common and easily recognized. The sporangia are large, up to 4 mm. in total height, obovoid or somewhat lengthened, and of a yellowish to chestnut or purple-brown color. The peridium or sporangium-wall is smooth, shining, tough and brittle, often contracted or shrunken as it surrounds loosely the enclosed capillitium and spores. The lime-knots are large and brown but often faded to white; and together with the spores present a dark appearance, under a hand lens, when the wall has ruptured. The stalks are membranous, yellowish, and weak, so that the sporangia are often recumbent, and arise from a spreading base of the same color, which is called a hypothallus.

Genus 6. DIDERMA

We now come to a genus in which granular lime will be present in the peridium, stalk, or columella, or all of them together, but not in the capillitium like in *Badhamia*, *Physarum* and allied genera. The capillitium consists of hyaline, purplish, or dark purplish threads without lime. The common species, found everywhere on leaves in damp places, is *D. effusum*. It forms white, sessile, flattened sporangia and plasmodiocarps, usually irregular in shape, and the plasmodiocarps often effused like a thin smear. The columella is depressed, in many instances hardly more than a yellowish or reddish-brown inside base. *D. testaceum*, also common on leaves, forms similar depressed sporangia, but they are more circular, and pinkish when fresh, although rapidly fading to white. The columella there is large, convex or hemispherical, and reddish-brown. *D. floriforme* is a stalked form found on very rotten wood. The yellowish stalk is rather stout and long supporting a globose, yellowish sporangium with a tough wall, which, when it opens, splits in a petal-like manner and exposes the almost black, spherical mass of capillitium and spores. Within the capillitium is a large, globose, yellowish columella coming from the stalk. The form, when open and expanded, looks like a miniature flower. The spores have large scattered warts which distinguishes it from *D. radiatum*

where similar phases occur, but the spores there have small, uniformly distributed, spines.

Genus 7. DIACHEA

In this genus of a few species the capillitium is a network of purplish threads without lime-knots. The peridium has no lime and is membranous, and hyaline or iridescent. There is granular lime, however, in the stalk and columella, both of which are usually present. The abundant species hereabouts is *D. leucopodia* having cylindrical, blue or purple, iridescent sporangia with white, brittle, calcareous stalks and columellae. It cannot be confused with any other species of Mycetozoa. There is a globose variety which is close to other globose species of the same genus, and cannot be determined so readily unless in company with the typical form.

Genus 8. DIDYMIUM

This is one of the four genera of the Mycetozoa in which lime is present in crystalline form. In Didymium it is often in stellate clusters sprinkled on the sporangium-wall, or in a closely compacted layer forming an outer layer of the peridium. The capillitium in nearly all species consists of hyaline or purplish threads without lime in normal developments. Sometimes, when abnormal, there are traces, and in one species, *D. Sturgisii*, it is normal and prominent. Most of the species form sessile sporangia or plasmodiocarps and are seldom collected in this region. Three species having stalks and columellae are abundant and are separated mainly on the differences in those characters. Columellae otherwise are rare. *D. squamulosum* has white, subglobose, umbilicate sporangia on short, white, stalks which usually spread at the bases, and white or yellowish columellae. It also forms sessile sporangia and plasmodiocarps. *D. xanthopus* has more hemispherical, umbilicate, white sporangia on much longer stalks, which are yellow or reddish-brown, translucent, and free from lime. The columella is white. *D. melanospermum* has sporangia like *D. xanthopus* but somewhat larger, on short, dark, opaque stalks, and the columella is dark. *D. xanthopus* and *D. melanospermum* do not form sessile sporangia or plasmodiocarps; and all three species have the lime crystals sprinkled on the sporangium-walls.

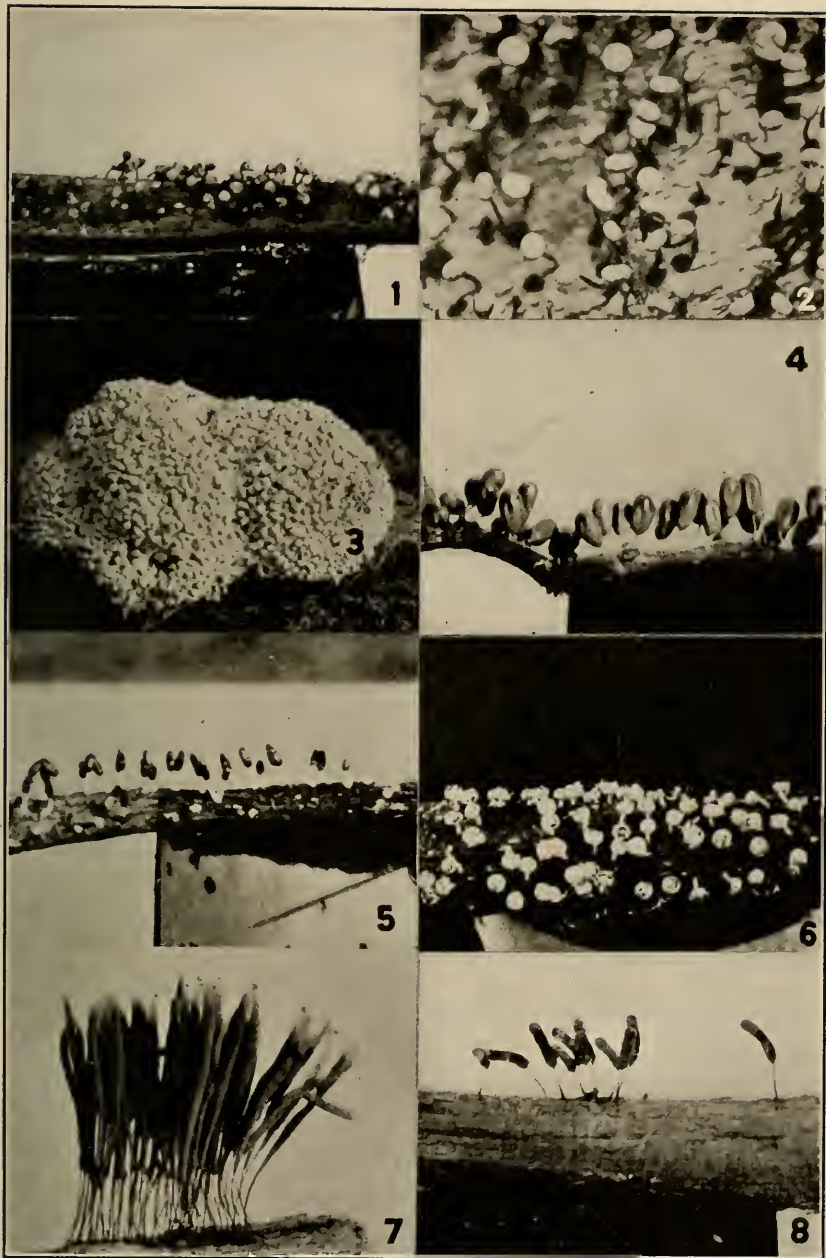
Genus 9. STEMONITIS

In this genus, and in all those that follow it, there is no lime. The fructification in *Stemonitis* is different from that of all other genera mentioned in this paper except *Comatricha*, *Enerthenema* and *Lamproderma*, which are allied. In *Stemonitis* there is a solid, black stalk which extends to almost the top of the sporangium as a columella, except in certain confluent forms. The brown capillitium springs from the part regarded as a columella, the outside branchlets united to form a surface net beneath a frail peridium, which latter is rapidly evanescent. The species of the genus do not form sessile sporangia or plasmodiocarps. The sporangia are narrowly cylindrical, and in some instances reach a height of 20 mm. or more. They usually form large colonies, either closely fasciculate or in smaller tufts, and the color in most of the species is some shade of purple-brown. Three species are abundant everywhere, and are distinguished on spore and surface net characters, and somewhat by the color. *S. fusca* is usually dark with a closely meshed surface net. The spores have spines arranged in more or less reticulate fashion. *S. splendens* is usually larger and not so dark, but more of a purplish-brown color. The surface net is coarse, of very large meshes, and the spores are faintly and closely warted without reticulations. *S. axifera* has a reddish, ferruginous color, and the surface net is close, like *S. fusca*, but the spores are almost colorless, nearly smooth, and very small, 4–6 μ diam. The spore color of *S. axifera* is an exception to the general rule of purple tinted spores as mentioned earlier, the tint here being ferruginous. Around these three species are grouped several others having different combinations of the characters mentioned; and

EXPLANATION OF PLATES

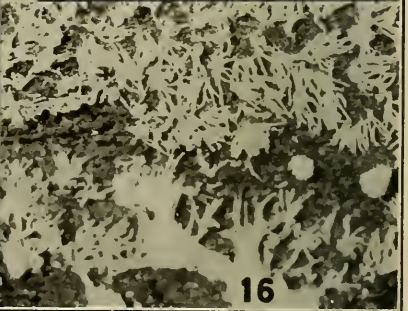
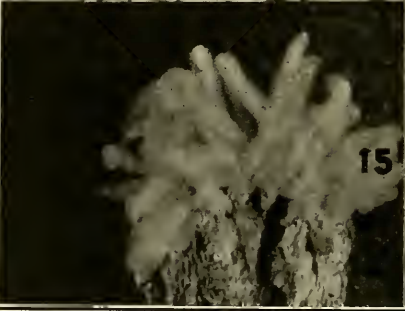
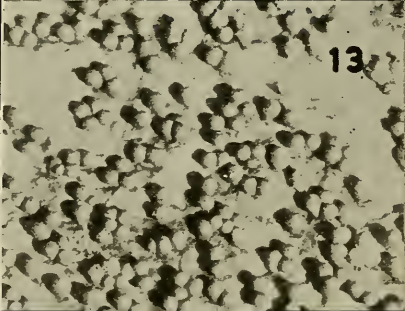
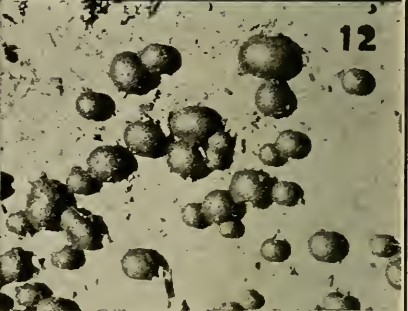
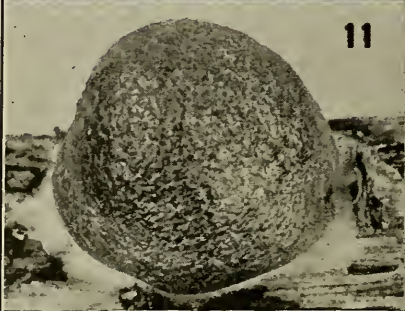
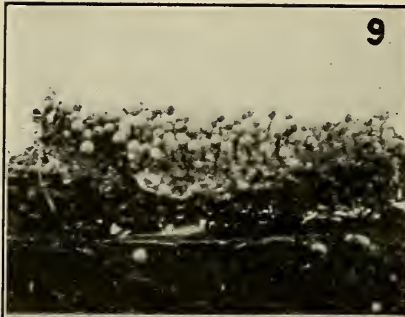
PLATE I

- Fig. 1. *Badhamia rubiginosa*, $\times 4$
 Fig. 2. *Physarum viride*, $\times 10$
 Fig. 3. *Fuligo septica*, $\times 1$
 Fig. 4. *Leocarpus fragilis*, $\times 4$
 Fig. 5. *Diachea leucopodia*, $\times 4$
 Fig. 6. *Didymium squamulosum*, $\times 4$
 Fig. 7. *Stemonitis axifera*, $\times 3$
 Fig. 8. *Comatricha typhoides*, $\times 4$



MYCETOZOA

Plate I



other species of the genus have other pronounced characters. They require close microscopical study in order to make proper determinations.

Genus 10. COMATRICHA

The genus is closely related to *Stemonitis* and differs materially only in the absence of the surface net to the capillitium. However, this is not a sharp line of demarcation as certain species of *Comatricha* have a partially developed net, and some species of *Stemonitis* have an imperfectly developed one. The same general conditions and brownish colors prevail, and in addition in *Comatricha* we have globose sporangia; a greater tendency to form a more persistent peridium and a columella that in some species divides into branches instead of continuing to the top. A number of species are quite common but it would take too much space to describe them all. *C. nigra* has globose sporangia with a dense capillitium, and a columella that extends to the top. If the columella divides into several branches it is *C. elegans*. Both species have long stalks. *C. typhoides* has cylindrical sporangia on long or short stalks, and is often 3-4 mm. in height. The stalk often has a thin, white membrane surrounding it. There is also usually a gray peridium which persists for some time before it peels off. The species can always be recognized by the spores which have a few prominent warts, not seen in any other member of the genus.

Genus 11. ENERTHENEMA

In this genus the black stalk and columella ends in a shining, black, circular disc from which the dark capillitium hangs. The common and typical species is *E. papillatum*, and the other two, which are rare, differ little therefrom. The disc on the outside distinguishes the genus from all other species of *Mycetozoa*.

PLATE II

- Fig. 9. *Lamproderma arcyronema*, $\times 4$
- Fig. 10. *Cribraria intricata*, $\times 6$
- Fig. 11. *Enteridium rozeanum*, $\times 2$
- Fig. 12. *Lycogala epidendrum*, $\times 1$
- Fig. 13. *Trichia varia*, $\times 8$
- Fig. 14. *Arcyria denudata*, $\times 4$
- Fig. 15. *Arcyria nutans*, $\times 3$
- Fig. 16. *Ceratiomyxa fruticulosa*, $\times 6$

Genus 12. LAMPRODERMA

The genus is recognized instantly by the shining, silvery, brassy, blue, or purple, more or less persistent peridium, which is often brilliantly iridescent. Most of the sporangia have black stalks and columellae. Several species may be found locally, but not often, except *L. arcyriionema* which is common in large developments on wood. The sporangia are globose with steel-gray peridia which break away in large patches exposing almost black, globose masses of capillitia and spores. The stalk is black, slender, two or three times the size of the sporangium and continues as a columella which divides into a much branched dark capillitium.

Genus 13. CRIBRARIA

The genus, comprising about 20 species, is related to only two other monotypic genera, Dictydium and Lindbladia, the last not described in this paper. The developments are always in sporangia on more or less crooked, dark stalks. There is no uniformly closed peridium, except occasionally in one species; and there is no capillitium. The sporangium-wall, at the base forms a cup or calyculus, which is often only a thickened base, or may be absent entirely. Above, and merging into the cup, is a net of slender threads more or less expanded or thickened at the nodes. The spores lie within this net and are dispersed through the meshes. The colors of the various species are yellowish, brownish, purple-red or violet-blue. Species known to occur in this region are rarely collected except *C. intricata* and *C. tenella*, but these are typical of the genus and abundant. Both form globose, ochraceous sporangia on dark stalks, with cups that may reach to one-third the sporangial height, or smaller to obsolete entirely. The nodes of the net in *C. intricata* are thickened, dark, prominent, and polygonal or branching. In *C. tenella* they are also thickened and dark, but rounded or globose, and not so prominent as in *C. intricata*. There are frequent intermediates which cannot be placed definitely. Forms of *C. intricata* with obsolete cups are also known as *C. dictydioides* but such are only phases of *C. intricata*. The same phases occur in *C. tenella* and are not taken seriously there.

Genus 14. DICTYDIUM

There is but a single species, *D. cancellatum*. It is related to *Cribraria*, but the wall instead of forming a net with nodes, consists of numerous, straight ribs extending from the base to the apex, and connected by transverse, slender threads. Occasionally there is an irregular net at the top, and often a more or less well defined cup at the base. The color is purple-brown or purple, and the long crooked or twisted stalks are red or purple-brown. Several varieties are based on color; the presence of a cup; or the presence of a net in the upper part. The species is an exception to the rule of spore color as in the purple phase the spores also show purple tints. The form is common and abundant.

Genus 15. TUBIFERA

In this genus the three species form aethalia or clusters of more or less closely compacted, brown, erect, cylindrical sporangia. There is no true capillitium. The common species is *T. ferruginosa*, forming aethalia 1–8 cm. across. The sporangia are usually connected but they may be almost free at times. The aethalia show on the outside the convex or conical apices of the component sporangia. *T. stipitata* is the same as *T. ferruginosa* but has a short, stout, spongy-like stalk. *T. Casparyi* is also like *T. ferruginosa*, but not common, and has in many sporangia a long, thin, dark, columella attached by processes to the wall.

Genus 16. ENTERIDIUM

In this genus the individual identity of the component sporangia is so far lost that only vestiges of the former peridial walls remain within the aethalium. The common species is *E. Rozeanum* which has brown, subglobose or irregular aethalia up to 4–5 cm. across. The cortex or peridium is firm, and if this is lifted partly with a needle, there will be observed attached to it many perforated, membranous bands or plates. The form resembles *Reticularia lycoperdon* in appearance, and also in the spores, but in that monotypic genus the attached plates are absent, and instead there is a bush-like mass of stranded threads at the base of the aethalium.

Genus 17. LYCOGALA

The common species is *L. epidendrum* which is so abundant and well known that it hardly needs description. The aethalia are subglobose of a grayish to black color, but with yellowish, reddish, or brownish tints occasionally. The average size is about 10 mm. diam. with smaller and slightly larger ones in the same development. The mass of spores in fresh material is pinkish. There is no true capillitium, but short threads running in from the cortex form a sort of pseudo-capillitium. There are only two other species in the genus which are rarely collected. *L. conicum* is smaller and conical in shape. *L. flavo-fuscum* is much larger and looks like a puff ball.

Genus 18. TRICHIA

In all preceding genera where a capillitium is present, the threads are smooth and not ornamented except in a few specific instances where small spines appear. We now come to four genera where the threads of the capillitium are ornamented in various ways. Also, curiously, a columella is lacking in all species of these genera. In *Trichia* the threads of the capillitium are free and not attached to any part of the sporangium—therefore doubly terminated. This feature appears in only a few species of the Mycetozoa other than in *Trichia*. In all others the capillitium is attached to some part of the sporangium. In *Trichia* the free threads, or elaters as they are called, are ornamented with from two to five spiral bands or thickenings which wind around the elaters, usually like the threads of a left-handed screw, but sometimes in the other direction. In addition, the elaters are often marked with spines of varying lengths in different species. A number of species also have beautifully reticulated spores. Specific distinctions are based on elater and spore characters; the absence or presence of a stalk; and the character and color of the sporangium-wall. Only one *Trichia* is red, and that is *T. floriformis*, a stalked form with reddish elaters and spores. It resembles *Hemitrichia vesparium* in appearance but has free elaters. The majority of the species are yellow in color with yellow elaters and spores. Among them is *T. varia*, a common form, producing sessile or stalked sporangia, or short plasmodiocarps, the stalks when present being short and black. *T. varia* is the only *Trichia* with two spirals on the elaters, all

others having three or more, so that the spirals are diagnostic. *T. persimilis* is another common form and in the group with reticulated spores, but the poorest member in that respect as the reticulation is not continuous, but broken or partly replaced by warts. The species forms small groups of crowded, globose, sessile sporangia. Near to it and fairly common is *T. favoginea* which has lengthened, sessile sporangia, also densely crowded. The elaters are much broader than in *T. persimilis*, and the spores are beautifully reticulated with continuous bands showing from three to five meshes to the hemisphere. Among the brown forms, *T. contorta* is the only one that forms sessile sporangia, and it is common.

Genus 19. HEMITRICHIA

There is only one important difference between the genus and *Trichia*. The capillitium consists of a more or less elastic network of branching threads, parts of which are attached to the sporangium. This has spirals like in *Trichia* and occasionally spines. The same yellow colors predominate. *H. vesparium* is the only red species on red stalks with red capillitium and spores. The sporangia are usually combined in clusters and have firm walls, and often distinct lids. When empty the cluster appears like a miniature wasp's nest, from which the species takes its name. *H. clavata* is a yellow form on brown stalks. The sporangia are turbinate or funnel-shaped, and the yellow capillitium protrudes therefrom in an expanding mass. *H. serpula* produces elongated, branching, and netted plasmodiocarps extending 1-8 cm., and yellow throughout. The three species can be readily recognized.

Genus 20. ARCYRIA

The species of *Arcyria* form stalked sporangia, the upper part of the wall evanescent, but persisting below as a deep or shallow cup. The capillitium is attached to this cup, more or less, and arises therefrom as a tall, expanded, netted mass. The capillitium is variously ornamented with spines, warts, cogs, or half rings, but not with distinct spirals as in *Trichia* and *Hemitrichia*. The predominating colors are red, yellow, and white. Among the red forms, *A. denudata* is extremely abundant. The cup is shallow and the capillitium is firmly attached to it

at many points. *A. incarnata* is similar but the capillitium expands more and is only lightly attached by a few threads to the center of the cup. There are two other red species similar to *A. incarnata* but nor common, and distinguished by spore and other characters. *A. insignis* has small pinkish or flesh-colored sporangia, arranged usually in small clusters. The common yellow form is *A. nutans* which has a long expanding capillitium so lightly attached that it is often separated when found. The white or grayish cylindrical form with capillitium firmly attached is *A. cinerea*. A variety of this called *digitata* has the sporangia clustered together with the stalks confluent or partly so. *A. pomiformis* is a small, yellowish form, globose or almost so, and scattered in small developments. *A. stipata* is copper-colored.

Genus 21. PERICHAENA

The genus is still controversial as to the members composing it. The two common species mentioned are generally accepted. *P. corticalis* forms chestnut-brown or purple-brown, subglobose, sessile sporangia, often crowded. The dehiscence or splitting of the sporangium-wall is in an irregularly horizontal manner or by a distinct, convex lid, exposing the yellow spores and scanty yellow capillitium, which latter may be absent entirely. The capillitium may have simple or branched threads, free or attached to the wall. The threads are irregular in breadth, warty or spinose, but rarely smooth. *P. depressa* is similar but the sporangia are larger, much flattened, and usually angled by mutual pressure. The dehiscence by a lid is pronounced, and the capillitium is usually abundant. In either species lime is sometimes present in the wall or lid, or both.

Genus 22. CERATIOMYXA

All species of the Mycetozoa, except *C. fruticulosa* the only member of this genus, have spores that are developed within a wall or peridium whether definite, indefinite, or evanescent. In the present species the spores are developed on the outside of the fruiting body. The fructification consists of numerous, small white bodies called sporophores, which branch or fork and resemble a minute bush or tree. On them are many small, slender stems, each of which carries an ellipsoid, colorless spore. The

fruiting bodies may be found everywhere throughout the season on very rotten wood.

CONCLUSION

These brief descriptions should not be accepted as definite or conclusive in all instances. They apply to perfect and typical examples, and, in the main, give the prominent, outstanding characters. There is much variation in size, color, shape, stalk, and internal characters within species of the Mycetozoa; and between species and genera there are many intermediate forms. These and the abnormal forms that often appear are interesting subjects for critical study.

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